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Indian Standard
SPECIFICATION FOR BRASS WIRES FOR GENERAL ENGINEERING PURPOSES
(First Revision)

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SPECIFICATION FOR BRASS WIRES FOR GENERAL ENGINEERING PURPOSES
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Indian Standard
SPECIFICATION FOR BRASS WIRES FOR GENERAL ENGINEERING PURPOSES
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 29 May 1981, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 Brass wire is used in a number of engineering applications in the form of rivets, bolts and nuts, wire cloth, pins and nails, fasteners, hooks, buckles, springs, etc. This standard was earlier published in 1967. In this revision, for diameters and tolerances, reference has been made to IS : 9861-1981* and chemical composition and tensile properties have been slightly modified.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of brass wires for general engineering purposes.

2. TERMINOLOGY

2.0 For the purpose of this standard the following definition in addition to those given in IS : 3288 (Part I) - 1981‡ shall apply.

2.1 Wire — Rolled, extruded or drawn product of solid section of uniform cross section along its whole length and the distance between two parallel faces not exceeding 6 mm; may be supplied in straight length or in coils or on spools.

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*Dimensions for wrought copper and copper alloy wires for general engineering purposes.

†Rules for rounding off numerical values (*revised*).

‡Glossary of terms for copper and copper alloys: Part I Cast form and wrought form (main types) (*second revision*).

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of material shall conform to IS : 1387-1967*.

4. CHEMICAL COMPOSITION

4.1 Brass wires, when analysed in accordance with IS : 3685-1966† shall have the chemical composition as given in Table 1.

TABLE 1 CHEMICAL COMPOSITION

Constituent	Alloy Designation, Percent	
	CuZn30	CuZn37
Copper	68·5 to 71·5	62·0 to 65·0
*Lead, *Max*	0·05	0·30
Iron, *Max*	0·05	0·10
Total impurities, *Max*	0·3	0·6
Zinc	Remainder	Remainder

Note — The chemical analysis for total impurities is not required if the supplier undertakes and certifies that the material does not contain impurities in excess of the limits specified.

*In case the material is required for hot rolling, lead may be restricted to 0·015 percent *Max*.

5. PHYSICAL PROPERTIES

5.1 Tensile Test

5.1.1 Brass wires when tested in accordance with IS : 2656-1964‡ shall have the tensile properties as given in Table 2.

TABLE 2 TENSILE PROPERTIES

Condition	Alloy Designation CuZn30		Alloy Designation CuZn37	
	Tensile Strength MPa	Minimum Elongation on 100 mm Gauge Length	Tensile Strength MPa	Minimum Elongation on 100 mm Gauge Length
Annealed (O)	315, *Min*	45	325, *Min*	35
Half hard (HB)	460 to 620	—	460 to 620	—
Hard (HD)	620, *Min*	—	620 to 775	—

Note — 1 MPa = 0·102 kgf/mm².

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*General requirements for the supply of metallurgical materials (*first revision*).

†Methods of chemical analysis of brasses.

‡Method for tensile testing of copper and copper alloy wire.

5.2 Wrapping Test — The wire in the hard condition when wrapped round a wire of its own diameter to form a close helix of eight turns and then unwrapped for turn shall not break.

5.3 If required, the material shall be subjected to the following test.

5.3.1 *Cold Heading Test* — Sample wire of which the height will be equal to one and half times the diameter of the wire will be cut and crushed until the height is reduced to half of the diameter. This test shall be done on a press. After the test, the wire may not show any traces of cracks in its flanks.

6. FREEDOM FROM DEFECTS

6.1 The wires shall be clean, smooth, uniform in diameter and free from detrimental segregations, cracks, twists, and kinks.

6.2 Finish — The wires shall be finished by such cold working and annealing operations as would produce the required temper and surface finish as agreed to between the supplier and the manufacturer.

7. DIAMETERS AND TOLERANCES

7.1 The diameters and tolerances on the diameter of wires shall be in accordance with IS : 9861 - 1981*.

8. SAMPLING AND RETEST

8.1 In any consignment all the coils of wire of the same grade (in chemical composition), size, temper and manufactured by a single firm under essentially similar conditions of production shall be grouped together to constitute a lot.

8.2 Unless otherwise decided by mutual agreement between the purchaser and the supplier, each coil of wire shall be examined from each lot for freedom from defects (*see* **6**) and for tolerances on diameters (*see* **7**). Any coil found defective in accordance with the provisions of **6** and **7** shall be rejected.

8.3 Unless otherwise agreed by the supplier and the purchaser, either one test for chemical composition shall be conducted for each 50 kg or part thereof of wires in this lot or one test for 500 kg or part thereof of a lot comprising of the same cast.

Note 1 — The material required for chemical analysis from each of coil intended for testing shall be collected in accordance with IS : 1817—1961†.

Note 2 — When the size of the order does not permit grouping in the above quantities, the rate of testing shall be as agreed to between the purchaser and the supplier.

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*Dimensions for wrought copper and copper alloy wires for general engineering purposes.

†Methods of sampling non-ferrous metals for chemical analysis.

8.3.1 If the results as obtained for each of the chemical characteristics satisfy the corresponding requirements under **4**, the lot shall be considered as conforming to the chemical requirements of this specification.

8.3.2 If the test results fail to satisfy the requirements for any of the characteristics, two more tests for that characteristic shall be done on the same sample in order to confirm that the analysis has been done properly. If both of the test results satisfy the relevant requirements under **4**, the lot shall be considered as conforming to the specification, otherwise not.

8.4 The sample for physical tests shall consist of one coil for every 50 kg or part thereof in a lot.

8.4.1 The lot shall be considered as conforming to the requirements of wrapping test if all the test pieces subjected to this test satisfy the requirements.

8.4.2 The lot shall be considered as conforming to the requirements of tensile strength and elongation laid down in this specification if the mean and range calculated from the test results for each characteristic satisfy the conditions given below:

a) The value of the expression (mean+0·6 range) shall be less than or equal to the upper limit, and

b) The value of the expression (mean−0·6 range) shall be greater than or equal to the lower limit.

NOTE — In case there are more than 10 test results from a lot, they shall be divided into minimum number of groups approximately of equal sizes not exceeding 10. The criteria given above shall be applied to each such group separately.

8.4.3 When only one test is to be done on a lot for tensile strength and elongation, the lot shall be considered as conforming to the requirements of this specification, if the results so obtained satisfy the requirements specified in Table 2. If the test results fail to satisfy these requirements two more tests shall be done in order to confirm that the test has been done properly. If both these test results satisfy the requirements given in Table 2, the lot shall be considered as conforming to the requirements of this specification, otherwise not.

9. PACKING

9.1 The wires shall be coiled carefully and each length of wire shall be made up into a separate coil of weight up to 50 kg. The inner diameter of the coil shall be as agreed to between the supplier and the purchaser.

10. MARKING

10.1 Suitable metallic tags and labels with markings made on them to show the grade, and where applicable, temper of the material in addition to name of the manufacturer, mass, length and any such information required by the purchaser, shall be attached to each coil of the material.

10.1.1 The coils of wire may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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TO
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(First Revision)

(*Page* 3, *clause* 2.0, *line* 2) — Substitute 'IS 3288 (Part 3) : 1986‡' *for* 'IS : 3288 (Part I) - 1981‡'.

(*Page* 3, *footnote marked* '‡') — Substitute the following for the existing footnote:

'‡Glossary of terms relating to copper and copper alloys : Part 3 Wrought forms'.

(*Page* 4, *clause* 3.1, *line* 2) — Substitute 'IS 1387 : 1993*' *for* 'IS : 1387 - 1967*'.

(*Page* 4, *footnote marked* '*') — Substitute the following for the existing:

'*General requirements for the supply of metallurgical materials (*second revision*).'

(*Page* 4, *clause* 5.1.1, *line* 1) — Substitute 'IS 1608 : 1995‡' *for* 'IS : 2656 - 1964‡'.

(*Page* 4, *footnote marked* '‡') — Substitute the following for the existing footnote:

'‡Mechanical testing of metals — Tensile testing (*second revision*).'

(MTD 8)

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